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## THE USE OF HYDROCORTISONE BY LOCAL INJECTION\*

By P. HUME KENDALL

*From the Department of Physical Medicine, Guy's Hospital, London*

"Hasten, hasten; let us use the new drug before it stops healing."

NOT since these words were first spoken by Trousseau in 1858 can they have had more appropriate application than to steroid therapy. Following the report by Hench in 1948 of the effect of Kendall's Compound E in rheumatoid arthritis, enthusiastic practitioners all over the world have reported its successful use in a variety of conditions. Many of these results have, however, failed to be reproduced in subsequent trials, and although there remain a number of indications for its use, the preparation no longer has its place in the treatment of many of the diseases in which it was originally claimed to be of value.

The early results from the use of hydrocortisone have also been varied and controversial. This hormone was first introduced into clinical practice by Fourman in 1950 as a parenteral agent, and it was soon realized that its local action was at least four times as great as that of cortisone itself. Hollander *et al.* (1951, 1953a, b) and Boland (1952) reported large series of cases of rheumatoid arthritis and osteoarthritis in more than 90% of which they claimed to have obtained full, if only temporary, relief of symptoms by intra-articular injection of hydrocortisone. Results in this country, however, have not been so favourable.

More recently hydrocortisone has been shown to have some effect in soft-tissue conditions as well as joint affections. Quin and Binks (1954)

\* Based on a paper read at the Annual General Meeting of the British Association of Physical Medicine on April 22, 1955.

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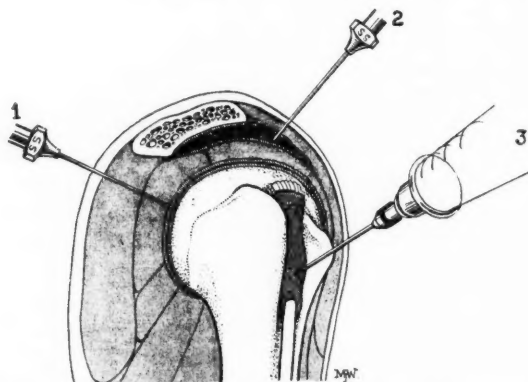
and Murley (1954) have had good results in the treatment of tennis elbow with the hormone, although Freeland and Gribble (1954) suggest that this method of treatment is no more effective than an injection of 5% procaine. Robecchi and Capra (1954) found it of considerable value in periarthritis of the shoulder, but Cyriax and Troisier (1953) report poor results in this condition, and Kuipers (1954) suggests that the results are inferior to those of parenteral treatment with ACTH.

Early in 1955, in a preliminary report, Crisp and Kendall showed that the accurate use of hydrocortisone was most effective in the treatment of a large number of soft-tissue lesions, particularly those around the elbow and shoulder-joint. Cyriax (1954, 1955) has fully described the importance and technique of accurate diagnosis and siting of the injection of hydrocortisone.

In the present paper are analysed the results obtained during eighteen months' experience with the hormone in the Physical Medicine Department at Guy's Hospital, during which 512 patients were treated.

### Technique Employed

In several ways our method of treatment has differed slightly from that employed by Cyriax (1954) in that (1) where a joint was injected we



Showing injections of the shoulder-joint: (1) into the joint space, (2) into the subacromial bursa, and (3) into the region of the long head of the biceps. (Reproduced, by kind permission of the Editor, from the *British Medical Journal*, 1955, 1, 1500.)

have invariably included 1,000 units of hyaluronidase to ensure maximum dispersal within the joint; (2) when treating soft tissues we have also injected 2% procaine in quantities varying from 1 to 3 ml., not only to ensure accurate localization, which is confirmed by temporary relief of pain, but also to produce some immediate alleviation for the patient,

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as the effect of the cortisone is not usually apparent for some hours. We have never used more than 2 ml. (50 mg.) of hydrocortisone, and seldom use less than 1 ml. (25 mg.).

In treating the shoulder-joint it has been our policy not only to inject the point of maximum tenderness or maximum pain on resisted movement, but to introduce the hydrocortisone into several points around the shoulder-joint to ensure the greatest possible contact with all layers of the rotator-cuff capsule. The injections were therefore sited at three different points (see Fig.): (1) posteriorly into the joint capsule; (2) anteriorly into the subacromial bursa; and (3) antero-laterally into the long head of the biceps. After injection the acute cases received no other treatment, but the longer-standing cases were given individual active assisted exercises twice or three times a week.

The total of 512 cases so far treated were originally selected at random without considering whether hydrocortisone would be likely to have effect or not. As the action of the hormone was still in doubt, it was concluded that the only way to discover in which cases it was effective was to try it.

### Results (see Tables I and II)

#### RHEUMATOID ARTHRITIS

Altogether 121 cases of rheumatoid arthritis have been treated. Although the results are not as good as those of Hollander, dramatic relief of symptoms and consequent increase in range of movement have been obtained in over 75%. Marked improvement in subjective symptoms, in joint swelling and tenderness, and fall in temperature were noted within 24 to 36 hours, followed by an increased range of active and passive movements. The improvement after the first injection was usually great enough to permit more intensive physiotherapy to be applied to the limb than was previously possible, and usually lasted from seven to ten days. This, combined with repeated maintenance doses of hydrocortisone at weekly intervals, resulted in a worthwhile improvement of the affected

TABLE I  
RHEUMATOID ARTHRITIS

Site Affected	No. of Cases	Marked Improvement	Partial Improvement	No Change
Knee-joint .. .. .	84	50	20	14
Other joints .. .. .	37	21	8	8
Total .. .. .	121	71	28	22

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limb. After two to three weeks it was found that the frequency of the maintenance dose could be fairly quickly reduced, remission occurring far sooner than would otherwise be expected.

In treating rheumatoid arthritis we now consider the intra-articular injection of hydrocortisone to be indicated in the following: (a) cases in which one or two joints are primarily affected; (b) cases with poly-articular affections which have responded to general treatment except for one or two joints; and (c) cases where cortisone or other drug therapy is being "tailed off".

### OSTEOARTHRITIS

When hydrocortisone was first available a controlled trial was undertaken in 72 cases of static bilateral osteoarthritis of the knee-joint, in all of which physical signs and at least moderate X-ray changes were present. In 36 of these cases 1 ml. of hydrocortisone with hyaluronidase was injected at weekly intervals for six weeks, the remaining 36 cases receiving injections of 2% procaine. At the end of treatment patients were examined independently by a member of the department who was unaware to which group each patient belonged. The over-all improvement in patients receiving hydrocortisone was found to be no better than in those given procaine injections. Far better results were obtained with hydrocortisone and hyaluronidase, however, in cases of early disease with minimal

TABLE II  
OSTEOARTHRITIS AND SOFT-TISSUE LESIONS

Condition Treated	No. of Cases	Complete Relief of Symptoms	Improved	No Change
Osteoarthritis:				
Static bilateral .. .. .	36	9	11	16
Exacerbation of symptoms by injury .. .. .	49	36	8	5
Periarthritis of shoulder:				
Acute .. .. .	61	45	13	3
Chronic .. .. .	23	13	5	5
Traumatic arthritis .. ..	41	37	—	4
Soft-tissue lesions:				
Tennis elbow .. .. .	96	64	21	11
Plantar fasciitis .. .. .	21	9	3	9
Acute tenosynovitis .. ..	26	14	8	4
De Quervain's syndrome ..	24	16	4	4
Bursitis .. .. .	14	10	3	1
Total .. .. .	391	253	76	62

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X-ray changes or where the osteoarthritis had been aggravated by injury, 41 cases of which were treated. Here the governing factor is obviously the amount of active inflammation present in the affected joint: the greater the inflammation, the greater the response to hydrocortisone.

### SHOULDER-JOINT LESIONS

In the treatment of various soft-tissue lesions around the shoulder-joint results have been particularly good. For the purpose of analysis cases have been divided into acute and chronic. The former comprises all those in the earlier stages of activity and includes such local conditions as supraspinatus and subscapularis tendinitis; the chronic group contains long-standing cases in which fibrosis and limitation of movement were the prime features and in which the symptoms of acute inflammation had subsided.

Of 61 acute cases treated, 45 obtained complete relief of symptoms within seven to fourteen days from the injection of hydrocortisone alone. Only three cases failed to improve at all. In the chronic cases of "frozen shoulder" the results were not nearly so good, presumably because the inflammation had subsided and the fibrinolytic action was less powerful. Nevertheless 13 out of the 23 cases progressed to complete recovery with hydrocortisone injections and exercises over a period of four to six weeks.

### TRAUMATIC SYNOVITIS AND HAEMARTHROSIS

The synovial effusion which follows joint sprains where there is no serious ligamentous or bony injury resolves very rapidly after the injection of hydrocortisone and hyaluronidase. Of 41 such cases treated, all but 4 showed this rapid response, the majority within 26 hours of starting treatment; normally aspiration was not performed. Although not recommended in every case, this treatment may prove of value for those patients in whom a rapid recovery is required for economic or sporting reasons.

In haemarthrosis the combined injection can have quite dramatic results, and the following is a typical example of the type of response that occurs:

C. G., a man aged 25, suffered a blow to his knee while playing Rugby football. When seen 24 hours later he was found to have a haemarthrosis without bony or serious ligamentous injury, and 40 ml. of blood was aspirated from his right knee. Hydrocortisone, 50 mg., and hyaluronidase, 1,000 units, were injected and a crêpe bandage applied. His business precluded him from resting and he continued his normal activities. Within 48 hours there was no trace of effusion in the knee and he had an almost full range of movement. Within seven days he had full, painless movement with no signs except fading bruising around the joint.

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### OTHER SOFT-TISSUE LESIONS

In tennis elbow, golfer's elbow, plantar fasciitis, De Quervain's syndrome, and tenosynovitis, relief in a high percentage of cases has followed the injection of hydrocortisone. Although we have had 26 absolute failures out of 150 cases treated, the over-all recurrence rate after a successful result has not exceeded 10%. It is interesting to note that for some inexplicable reason there is an exacerbation of symptoms 24 to 36 hours after the injection, which is subsequently followed by complete relief.

### Other Conditions Treated

#### TRAUMATIC ARTHRITIS OF THE ELBOW-JOINT

The introduction of hydrocortisone in the treatment of post-fracture, post-operative, and post-traumatic arthritis of the elbow-joint has proved of great value. We were first made aware of its potentialities in this group of conditions by the following case:

T. L., a schoolboy of 10, fell and injured his left elbow. He was X-rayed immediately, and as no bony injury was seen the arm was put in a sling. After a week there was complete absence of all joint movements, which persisted despite further rest for three months.

Examination at this time showed only 10 degrees of flexion or extension, and pronation and supination were also markedly reduced by painful spasm. Within three days of the injection of 25 mg. of hydrocortisone his movements had increased, and after ten days were full and painless.

Since then we have had many similar cases, and increasing experience in the various types of fracture around the elbow-joint has shown that the range and strength of exercises can be increased far more rapidly after hydrocortisone injection than without this treatment. The rehabilitation time is subsequently much reduced.

#### ORTHOPAEDIC CONDITIONS

Several cases of dislocation of the shoulder have been treated with injections of hydrocortisone shortly after reduction; trials have also been conducted in the post-operative treatment of arthrotomy of the elbow, hip, knee, and toe joints. As yet there have been too few cases to warrant any conclusions, but it is worth mentioning that subsequent rehabilitation has been much easier, quicker, and more comfortable for the patient, though no reduction in healing time has been noted.

### Side-effects

So far few side-effects have been observed. A local urticaria of short duration has occurred in three cases, and there have been two cases of

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local inflammation. In another a suppurative arthritis followed injection of a knee-joint for acute synovitis; this was relatively mild, and resolved spontaneously without any specific treatment, the original condition improving within a week. None of the usual general symptoms associated with parenteral steroid therapy have been recorded.

### Discussion

In selected cases of rheumatoid arthritis and osteoarthritis, in tennis elbow, tenosynovitis, most forms of acute traumatic joint lesions, and acute lesions around the shoulder-joint, injection of hydrocortisone is without doubt an effective treatment which is followed by a high percentage of successful results.

This success is explainable by the fact that all these conditions are the result of an active inflammatory reaction, the hormone exerting its main effect as an "anti-inflammatory" agent. Its undoubted success in trigger finger, chronic "frozen shoulder", and post-traumatic lesions of joints and soft tissues is more difficult to explain. It may well be that hydrocortisone is more strongly fibrinolytic than was hitherto thought, or that our conception of the pathology of such conditions is basically incorrect in that inflammatory reaction in the collagen tissues plays a greater part than has so far been recognized. Obviously a good deal of investigation in this field remains to be carried out, and yet further uses for the drug may be revealed.

The main value of hydrocortisone in the treatment of some of the conditions discussed above is not so much that it is curative, as many of these cases remit without treatment, but that it hastens recovery, and this is the aim of those concerned in rehabilitation.

### Summary

Experience over eighteen months with local injections of hydrocortisone is described, with results in 512 cases of various joint and soft-tissue conditions.

For intra-articular injection hyaluronidase has been combined with the hydrocortisone to ensure maximum dispersal; and when treating soft tissues 2% procaine has also been injected to ensure accurate localization.

Good results have been obtained in rheumatoid arthritis, osteoarthritis, and lesions around the shoulder-joint; also in traumatic synovitis and haemarthrosis.

Hydrocortisone injections have given relief in a high percentage of cases of tennis elbow, golfer's elbow, plantar fasciitis, De Quervain's syndrome, and tenosynovitis. Traumatic arthritis of the elbow-joint has also been treated.

Few side-effects have been observed.

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### Acknowledgments

I am indebted to the staff of the Wills Library at Guy's Hospital for their constant advice and assistance throughout this investigation, and to the Department of Medical Illustration for their most willing aid.

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## PLASTIC SPLINTS IN THE TREATMENT OF JUVENILE RHEUMATOID ARTHRITIS

By J. B. BRENNAN

*From the Whittington Hospital, London*

ONE of the most difficult problems in the management of juvenile rheumatoid arthritis is to maintain the joints in their correct functional position during the active phases of the disease. During this time the joints are held in flexion deformity by painful muscle spasm, and the child will vigorously resist attempts to extend them passively. The obvious answer is to splint the joint, but this is often difficult (1) because the patient will seldom tolerate splinting of the usual plaster-of-Paris type (cellulose acetate was an advance, but had its difficulties and dangers); and (2) there is often multiple joint involvement, and to make cellulose acetate splints from plaster-of-Paris casts is a lengthy business. Thus, for one reason or another, either the joints are not splinted or the splints are not tolerated, and when the disease goes into remission it is found that the affected joints are fixed in bad functional positions.

Unfortunately joints which are of great importance from the functional point of view—the finger and carpal joints, the knee, ankle, and tarsus—are frequently involved. The cervical part of the vertebral column is also often affected, and if allowed to fix in flexion causes grave disability.

Our plan in treating children with multiple joint involvement is to splint the wrists in 30 degrees dorsiflexion, the knees in 5 to 10 degrees flexion, and the feet in 90 degrees dorsiflexion. The neck is supported in neutral position by a cervical collar. The joints are kept relatively pain-free by the splints and require only the minimum amount of physiotherapy to maintain mobility. The elbow, shoulder, and hip joints receive intensive physiotherapy directed towards relief of pain and maintenance of function.

### **Description of Splint**

The problem of which type of splint to use seems to have been solved by the introduction of the "direct-to-patient" application of the thermoplastic polythene, using another plastic, polyurethane, as a heat-resistant insulating layer between the patient and the heat-softened polythene. With this material any or all of the joints enumerated can be immobilized at very short notice, the production of any one splint or the cervical collar taking not longer than thirty minutes. If more than one splint is made at the same time the process is shortened in proportion.

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The designs and the technique of application have been fully described elsewhere (Brennan, 1954, 1955). None of the children fitted with such splints have been at all upset by the application of the warm plastics; indeed the very fact that they are warm to the touch has been of great value in coaxing out the flexed limb or neck to the correct position and maintaining relaxation of the spasm while the polythene cools and hardens. The limb will seldom go back into spasm before the splint is trimmed and provided with straps and buckles and ventilation holes, which take only ten minutes or so. Thus when finished it can be put straight on without fuss. When in position on the limb the splint supports the joint and relieves the muscles controlling it of the need to maintain immobilization by prolonged and painful spasm.

### Advantages

A brief description of the virtues of this type of splint may be useful. First, the soft spongy polyurethane lining makes a very comfortable padding, and children are quite content to wear the splints day and night, especially when they find that they greatly relieve their pain. Secondly, the splints are exceptionally light in weight: the wrist splint weighs  $1\frac{1}{2}$  oz., the leg splints 11 oz. each, and the cervical support  $6\frac{1}{2}$  oz. (see Plate I). The limb splints are made from  $\frac{1}{16}$ -inch polythene, strengthened on the flexor aspect with  $\frac{1}{16}$ -inch strips; and the cervical support from  $\frac{1}{8}$ -inch polythene. In both cases  $\frac{3}{16}$ -inch polyurethane is used for lining. Thirdly, both the polythene and its padding of polyurethane are washable with soap and water. If splints are not washed regularly perspiration will be absorbed by the spongy lining. They are unaffected by bodily secretions or excretions.

In this type of splint we have a really efficient appliance which is sufficiently light and comfortable to be tolerated for prolonged periods. Below are described two cases of juvenile rheumatoid arthritis in which such splinting has been used.

### Illustrative Cases

CASE 1.—The first case is that of a little girl of  $6\frac{1}{2}$  years, admitted on July 3, 1954, with an effusion at the base of the left lung and a temperature of  $104^{\circ}$  F. Pericarditis and a sparse petechial rash soon developed. Only a few small lymph nodes could be felt and the spleen was not palpable. On July 28 both wrists became swollen and painful, and the diagnosis of acute juvenile rheumatoid arthritis became clear. The wrist and carpal joints continued to be severely involved and flexion deformity was developing rapidly. Plastic cock-up wrist splints were made, the wrists being dorsiflexed to 30 degrees. As the fingers showed little evidence of disease they were left free, the child being encouraged to play with her toys. Her elbows were also involved to a lesser degree, but it

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was thought best to let her use her arms as freely as possible, so these were not splinted.

The disease was kept under control by cortisone therapy until December, 1954, when attempts to reduce the dosage produced a flare-up and other joints became affected, particularly the knees, ankles, and cervical spine. Signs were also present in the shoulders, hips, finger-joints, and tarsi, but were much less acute. Radiography of the carpi at this time revealed advanced osteoporosis and cortical erosion. Of the newly involved joints the knees and ankles were most affected, the former being held flexed at an angle of 90 degrees and the feet plantar-flexed. Attempts at passive correction caused severe pain and were strongly resisted. Leg splints were made extending from thighs to toes. During application the warm plastic overcame flexion spasm, and the splints were made with the knees flexed to 10 degrees only, as was desirable. Diagonal straps were provided to keep the feet dorsiflexed to 90 degrees. A cervical support was moulded with the neck in neutral position.

The child wore the splints continuously, day and night, without complaint. The cervical support was worn only during the day. They were of course removed for bathing and for her daily physiotherapy periods. A careful watch was kept on the hip-joints, but it was found that hip flexion was effectively prevented by splinting the knee in extension, and minimal nursing care was required. Fracture boards were used under a firm mattress to prevent kyphosis.

The dosage of cortisone and ACTH was very gradually reduced over many weeks, the former being stopped on April 22, and the latter on May 14, 1955. No rebound phenomena occurred, and by June 29 the amount of functional recovery was extraordinary, particularly in the joints which were splinted. The carpal and wrist joints, which had been very severely involved, had the following degrees of range: right wrist—flexion 80, extension 45; left wrist—flexion 60, extension 30. Supination and pronation were almost normal. The range of movement at the hip, knee, and ankle joints was within 0-10 degrees of normality. Cervical movements were nearly full with the exception of extension, which was limited to 30 degrees from the neutral position. There was a moderate degree of dorso-lumbar kyphosis. The shoulder and elbow joints showed a small amount of limitation, the right elbow, with 20 degrees short of full extension, being the worst. Muscle bulk and strength were fairly good, and the above range of movements could be produced actively by the child herself.

CASE 2.—The second patient was a girl of 9, admitted on December 8, 1954. Her left knee was swollen and painful and held in 90 degrees of flexion. No active movement was attempted, and passive extension or flexion caused pain and distress. The right knee and one or two joints of the fingers and toes were mildly affected. This was a known case of juvenile rheumatoid arthritis, having been treated at the Hospital for Sick Children, Great Ormond Street, in 1952 for this complaint. There had been no symptoms during the intervening period.

A plastic knee splint was made by the method described. During application the knee could be straightened to only 30 degrees of flexion. After the

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splint had been worn at this angle for a few days all painful spasm disappeared. This same splint was then reheated and applied again with the knee in 5-10 degrees of flexion. The other knee was also splinted.

There was a progressive improvement with splinting and physiotherapy, and on her discharge on March 17, 1955, the patient was walking normally with a full range of painless movement in the knee-joints. When last seen as an out-patient on June 7 her condition had been maintained.

No drugs were used in this case.

### Conclusion and Summary

I have been unable to find any published work dealing particularly with the beneficial results of prolonged splinting in arthritis, though it is universally accepted that much pain and deformity can be prevented by adequate immobilization. This is probably because there has never been any type of splint which was comfortable enough to be worn for many months, both day and night; and this constant usage is a vital factor during active joint disease.

The introduction of the polythene-polyurethane splint described provides an appliance which combines the qualities of strength, lightness, and comfort, and is in addition easy to make at low cost. The wrist splint illustrated costs only 1s. for material and takes twenty minutes to make. I have many arthritic and neurological patients who have been wearing such splints constantly for almost a year, and find them not only tolerable but a great help. To illustrate the result of prolonged splinting two cases in young children with acutely painful joints as part of a severe generalized illness have been described—in other words, patients whom one would least expect to take kindly to splinting, but who in fact did tolerate them without complaint and with great benefit.

### Acknowledgments

I would like to thank Dr. Simon Yudkin, Consultant Paediatrician,<sup>1</sup> Whittington Hospital, for permission to describe two of his cases; also Dr. G. Dobney, Director of Physical Medicine, Whittington Hospital, for his kindness in reviewing this paper and permission to publish it.

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# PLATE I

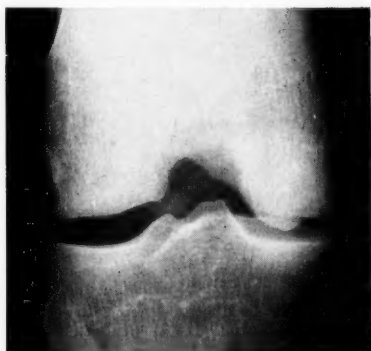


Wrist splints and cervical support made of polythene.

PLATE II



A. Radiograph showing early signs of osteochondritis in medial femoral condyle in male aged 31.



B. Loose body in right knee-joint in male aged 20. At operation to remove this a healed area of osteochondritis seen over medial femoral condyle from which presumably fragment had arisen.



C. Radiograph of male aged 20 with osteochondritis involving medial femoral condyles of both knees. In left knee area of rarefaction surrounding that of increased density is well shown. In right knee a healing cavity following extrusion of fragment.



D. Radiograph showing conventional A-P view of left knee in case of suspected osteochondritis dissecans; it appears normal.



E. Radiograph showing tunnel view of left knee of same patient as D. Note area of osteochondritis, clearly seen on medial femoral condyle.

[N.R.L., P.K.B.W.]

# OSTEOCHONDRITIS DISSECANS OF THE KNEE

## A REVIEW OF 55 CASES

By N. R. LEWIS and P. K. B. WHITE

*From the Royal Air Force Medical Rehabilitation Unit, Chessington, Surrey*

OSTEOCHONDRITIS dissecans of the knee is usually regarded as a rare condition, but during the last three years 75 patients with this disorder have been treated at the Royal Air Force Medical Rehabilitation Units at Chessington and Collaton Cross. This represents an incidence of 4% of all knee conditions treated at these units; a description of these cases may therefore be of interest. Of the 75 cases referred to full details of only 55 are available, and it is on these that this paper is based.

### Historical

Ambroise Paré was the first to describe the removal of a loose body from a joint. Sir James Paget described this particular lesion in 1870, while König coined the term "osteochondritis dissecans" in 1888. Since then there have been a number of contributions to the subject, especially regarding the aetiology of the condition. Axhausen (1912) considered embolism to be the cause, but Phemister (1924) thought that subchondral fracture was responsible. Fairbank (1933), in a review of the literature, strongly favoured trauma "pure and simple", suggesting that a violent inward rotation of the tibia, driving the tibial spine against the medial femoral condyle, was responsible for the injury in most cases. Shipp (1952) considered that repeated subclinical trauma or one major blow may so interrupt the blood supply of the subchondral bone as to bring about necrosis.

### Incidence

The average age at onset in the present series was 19.4 years, 37 (67%) of the 55 patients being between the ages of 18 and 20.

### Site

Osteochondritis dissecans may involve the knee, hip, ankle, elbow, or spine, either singly or in combination. The knee is most commonly involved, and here we are concerned only with this joint. It should be mentioned, however, that 5 patients (9%) had osteochondritic lesions in other joints; in 2 of these cases both knees were involved. One patient had lesions in the spine, hip, and knee; his father and one of his brothers

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also had widespread osteochondritic lesions. Table I shows the site of lesions in the knee-joint; it is of interest to note that in more than 20% of

TABLE I  
SITE OF OSTEOCHONDritis DISSECANs IN THE KNEE

Site	No. of Cases	%
Medial femoral condyle	37	67.3
Lateral femoral condyle	12	21.9
Medial tibial condyle ..	3	5.4
Patella .. .. .	3	5.4
Total .. .. .	55	100

cases the lesion was found in the lateral femoral condyle and that in a significant number of cases lesions were noted in the medial tibial condyle and the patella.

### Aetiology

A definite history of trauma from which symptoms dated was found in 38 cases (70%). The injuries complained of were usually twists, kicks, or direct blows to the knee, particularly when playing football. In 14 patients a history of trauma was doubtful, while in the other 3 there had definitely been no injury. No other aetiological factors were found in the series.

### Clinical Picture

This varied according to the stage of the condition when the patient was first seen. Those who sought advice before separation of the fragment complained of a painful synovitis. After the fragment had separated, all the signs and symptoms of a loose body—namely, locking, effusion, and weakness of the quadriceps—were present. In addition, most patients complained of a deep-seated aching pain in the knee. Often this was localized to the site of the lesion, but was sometimes generalized, and was frequently felt when the knee was at rest after exertion. Tenderness on deep pressure over the affected condyle was elicited in a number of patients, and many showed some limitation of flexion. In two cases the condition presented as an acutely inflamed knee and was clinically indistinguishable from an infective arthritis.

### Diagnosis

The diagnosis of osteochondritis dissecans can be made with certainty only from radiographs or at operation. A radiological diagnosis was made in 35 of the 55 cases in this series; the remaining 20 were diagnosed at



## Osteochondritis Dissecans of Knee

operation for suspected torn cartilage. Radiological signs of osteochondritis indicate, however, a fairly gross lesion. In several of our patients a small patch of osteochondritis dissecans was found at operation for meniscotomy though the radiographs were negative.

The earliest radiological sign is a zone of increased density with loss of definition. Later an area of rarefaction surrounding this zone appears. If the lesion does not heal, the dead bone may be extruded into the joint as a loose body, leaving a well-defined cavity in the bone. These changes are shown in Plate II. We have found that a tunnel view of the knee often shows the earliest changes when the conventional view reveals no abnormality (Plate II, D and E). The tunnel view is taken with the knee bent at an angle of 15 degrees and using a curved cassette; the posterior part of the condyles is then clearly visible. However, the early signs may not be shown on the radiograph even when a tunnel view is taken, and it is in these circumstances that a careful history and clinical examination will often reveal the characteristic site and nature of the pain. Even so the condition is not always easy to diagnose, especially when a torn cartilage coexists; furthermore the clinical picture seems to have surprisingly little correlation with the radiological appearance.

### DIFFERENTIAL DIAGNOSIS

The conditions from which osteochondritis dissecans must be distinguished are osteoarthritis, chondromalacia patellae, and chronic knee disability caused by a weak quadriceps muscle. In our opinion the last-named is a specific entity. Osteoarthritis of the knee is rarely accompanied by effusion, and when effusion is present it is usually small. The pain in osteoarthritis is relieved more readily by simple measures such as heat and quadriceps exercises. Chondromalacia patellae is itself a controversial condition. We regard it as a generalized degenerative process confined to the patella, and as such it usually presents with signs and symptoms of osteoarthritis in this region. Thus the pain is often fairly well localized to the patella, and rolling the patella on the femur almost invariably reproduces the pain.

### Treatment

The nature of a Service rehabilitation unit is such that it is not possible to discuss long-term treatment or follow-up, therefore we shall confine ourselves to describing immediate treatment. Owing to the long natural history of the disease, we saw patients at all stages. Each case was therefore treated individually and symptomatically. As in all knee disabilities, the development of a really good quadriceps was considered of paramount importance.

All cases showing signs of activity—that is, effusion, increasing pain, and limitation of movement—were treated by immobilization. In mild

## N. R. Lewis and P. K. B. White

cases the patient was kept in a back splint or put into a plaster-of-Paris cylinder; in severe cases a non-weight-bearing or walking calliper was applied for as long as six or seven weeks.

In the quiescent stage, with cessation of effusion, minimal pain, and a stable knee, movements were started. We found that this could be best effected by non-weight-bearing flexion exercises in the warm pool supplemented by carefully supervised non-weight-bearing exercises in slings in the physiotherapy department. At all other times a back slab was worn. If after two weeks on this regimen progress was good, full weight-bearing flexion was started and the back splint discarded. Graduated activity was then encouraged until full mobilization was reached, the patient being returned to duty in a modified category.

If signs or symptoms, such as effusion or pain, recurred, the patient was immediately immobilized, and this treatment was continued until the symptoms abated. If separation of a fragment was apparent in the radiographs the patient was referred for operation, as our experience agrees with that of Shipp (1952) and Van Demark (1952) that there is little likelihood of healing being obtained by conservative treatment in this type of case when the patient is over the age of 18.

### Results

The results of treatment are shown in Table II. It will be seen that 17 (30%) of the 55 patients were considered cured and 28 (50%) were returned to their units in a modified category, while 10 (20%) were invalided. The average time under treatment for the whole group was thirteen weeks, of which six weeks were spent in hospital and seven at the medical rehabilitation unit. Of the 55 patients 47 were operated on, for removal of either a cartilage or a loose body.

TABLE II  
RESULTS OF TREATMENT OF 55 CASES OF OSTEOCHONDRITIS DISSECANS OF KNEE

Groups	No. of Patients	Average Time at Hospital (days)	Average Time at M.R.U. (days)	Average Total Time Off Duty (days)	No. Returned to Unit for Full Duty	No. Returned to Unit for Modified Duty	No. Invalided
Post-meniscectomy	21	41	35	76	9	10	2
Removal of loose body .. ..	24	45	63	108	6	14	4
Patellectomy ..	1	35	45	80	0	1	0
Arthrotomy ..	1	73	29	102	0	1	0
Non-operational	8	21	69	90	2	2	4
Total .. ..	55	43	48	91	17	28	10

## Osteochondritis Dissecans of Knee

### Summary

(1) Of all patients referred to Royal Air Force Medical Rehabilitation Units with knee conditions during the last three years, 4% had osteochondritis dissecans. A detailed study was made of 55 cases.

(2) Osteochondritis dissecans is frequently due to trauma and may coexist with a torn cartilage.

(3) Early diagnosis is difficult, but suggestive features are aching pain localized to the affected condyle, local tenderness, and signs of a loose body in the joint.

(4) Tunnel views may reveal early lesions when straight radiographs are normal.

(5) In the acute stage immobilization is essential; later, carefully graduated rehabilitation is required. If the fragment separates, it should be removed.

(6) Of the 55 patients treated, 17 were returned to full duty, 28 to modified duty, and 10 invalided.

### Acknowledgment

We wish to acknowledge the continual kind advice and encouragement given to us by Squadron Leader C. B. Wynn Parry, M.B.E., Specialist in Physical Medicine to the Royal Air Force.

We are indebted to the Director-General, Royal Air Force Medical Services, for permission to publish this paper.

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# THE INCIDENCE OF ATELECTASIS AFTER HEART OPERATIONS WITH AND WITHOUT BREATHING EXERCISES

By B. STRANDBERG

*From the Department of Physical Medicine and Rheumatic Diseases,  
Copenhagen County Hospital, Hellerup, Denmark*

THE records of patients on whom cardiac surgery was performed at Rigshospitalet, Copenhagen, in the two periods 1948-9 and 1951-2 have been examined and compared in order to assess the value of breathing exercises. In the first period no pre- or post-operative exercises were given, such exercises having been introduced in 1950 by Professor Husfeldt. These were based on the principles of Linton and Reed (1953), of the Brompton Hospital, London, and were later modified by the physiotherapists Clausen and Veik. A standardized technique was in use by 1951.

## Material

The patients selected for this investigation fall into three groups:

1. Cases of Fallot's tetralogy treated by the Blalock-Taussig operation.
2. Cases of patent ductus arteriosus treated by ligation.
3. Cases of coarctation of the aorta treated by resection of the aorta.

In the first period (1948-9) ninety-nine operations were performed, sixty-six of the patients being under the age of 15. In the second period (1951-2) ninety-seven operations were performed and seventy-one of the patients were under the age of 15. The cases are analysed in Table I.

TABLE I  
DETAILS OF CASES OPERATED ON

Period	Group 1	Group 2	Group 3	Total
	Fallot's Tetralogy	Patent Ductus	Coarctation of Aorta	
1948-9 ..	47	39	13	99
1951-2 ..	43	44	10	97

The techniques of anaesthesia, fluid replacement, and chemotherapy were standardized by 1948 and were the same for all groups of patients under consideration.

## Atelectasis after Heart Operations

### Method

Pre-operative breathing exercises were normally given for one week, and post-operative exercises for four to five weeks starting on the day after operation, according to the following scheme:

1. Localized diaphragmatic breathing with prolonged expiration.
2. Localized bilateral basal expansion.
3. Localized posterior basal expansion.
4. Localized upper lateral expansion.
5. Localized expansion of the apex of the lung.
6. Shallow diaphragmatic breathing.
7. Relaxation, especially of the muscles of the chest and shoulder girdle.
8. Arm and shoulder movements.
9. Postural drainage (in the post-operative phase only).

Individual treatment was preferred, though in some instances patients were treated in small classes. Each treatment lasted about fifteen minutes, and was given three times a day at first, and reduced to twice a day one week after operation.

### Results

In the period 1948-9 thirty-three cases developed post-operative atelectasis (see Table II). The diagnosis was made on clinical and radiological grounds in twenty-eight cases four days after operation; in five cases diagnosis was made at autopsy.

TABLE II  
NUMBER OF PATIENTS DEVELOPING POST-OPERATIVE ATELECTASIS  
(Deaths in parentheses)

Period	Group 1	Group 2	Group 3	Total
	Fallot's Tetralogy	Patent Ductus	Coarctation of Aorta	
1948-9 ..	14	14	5	33(5)
1951-2 ..	3	5	1	9(0)

The atelectasis was left-sided in twenty-seven cases, being confined to the lower lobe in fourteen and to the apex in five; in five it was total. The right lobe was involved in six cases, the collapse being total in four, and localized to the right upper and middle lobes in the other two. Of the eight fatal cases in the series, five were due to total atelectasis; the causes of death in the other three cases were, respectively, interventricular septal defect with chronic valvular endocarditis, cerebral thrombosis, and cerebral hyperaemia.

## B. Strandberg

In the second period (1951-2) there were only nine cases of atelectasis, eight of which were left-sided. In six of these the collapse was localized to the upper lobe, and in one of these patients spondylitis reduced the efficacy of breathing exercises. Only two patients died during the second period, and no atelectasis was demonstrated at autopsy in these patients, death being due to haemorrhage and cerebral thrombosis respectively.

### Conclusions and Summary

1. Between 1948 and 1949 thirty-three out of ninety-nine patients on whom cardiac operations had been performed developed post-operative atelectasis, from which five died.
2. Between 1951 and 1952 only five patients out of ninety-seven developed post-operative atelectasis; none died.
3. In both periods the operative technique was the same, as were also the techniques of anaesthesia, fluid replacement, and chemotherapy. The only difference in the management of the patients in the two periods was that pre- and post-operative breathing exercises were given in the later series of cases.
4. It would appear, therefore, that pre- and post-operative breathing exercises are of value in reducing the incidence of post-operative pulmonary atelectasis.

### Acknowledgments

The patients reported in this series were under the care of Erik Husfeldt, M.D., and Fr. Therkelsen, M.D., Professors of Surgery in the University of Copenhagen. I wish to acknowledge their help and guidance, and also the help of O. Bøje, M.D., Reader in the University of Copenhagen and Head of the Department of Physical Medicine and Rheumatic Diseases.

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## CLINICAL REPORTS

### UNUSUAL CASE OF UNILATERAL SPASTIC WEAKNESS

CERVICAL spondylosis is with increasing frequency being diagnosed as the cause of neurological lesions in the upper and lower limbs. The following case may therefore be of interest as the differential diagnosis presented considerable difficulties, and pressure on the cord from a degenerated cervical disk was originally suspected.

#### Case Report

A female aged 48 years was referred to the Physical Medicine Department at the Peace Memorial Hospital, Watford, early in 1955. Her main complaint was of low back pain, but inquiry revealed that she was becoming increasingly disabled by weakness of the right arm and leg, which had originally been noticed by her in 1948 and had steadily progressed since that time. Her family history was without significance and she had previously enjoyed excellent health. The patient looked well and was alert and co-operative. There was no abnormality of the cardiovascular, respiratory, or renal system.

Examination of the central nervous system showed abnormalities to be confined to the right arm and right leg, in which spastic weakness was found. In particular, extension of the right wrist and all finger and thumb movements were very weak. In the lower limb, extension of the hip, flexion and extension of the knee, and all movements of the ankle, foot, and toes were weak on the right. There was no muscle wasting or fasciculation, nor any involuntary movements. In the sensory system sensation to light, touch, and pin-prick and to heat and cold was unimpaired. A diminution of vibration sense at the right ankle and poor position sense on testing the right great toe suggested involvement of the posterior column. There was no evidence to suggest a lesion of the cerebellar or extrapyramidal system. The patient had a marked limp and circumducted the right leg when walking.

The deep reflexes were not grossly abnormal. The biceps and supinator jerks were rather brisker on the right than on the left, but the triceps jerk was sluggish. The abdominal reflexes were normal. Both knee and ankle jerks were markedly increased on the right, though no clonus was elicited. Both plantar responses were flexor.

On examination of the skeletal system lateral cervical flexion to the right was limited; a dorsal structural scoliosis convex to the right was noted and the normal lumbar lordosis was increased. Pain was reproduced on full lumbar flexion. It seemed probable that the low back pain was the result of a lower lumbar strain aggravated both by the scoliosis and by the limp.

It was ascertained that in 1949 lumbar puncture gave normal results, and disseminated sclerosis had been diagnosed at the time.

X-ray examination of the cervical spine showed congenital fusion of the bodies of C 4 and 5.



## Clinical Reports

At this stage the patient was shown at a clinical meeting and various opinions were expressed. The history of the case and the absence of any cerebellar lesion were thought to make a diagnosis of disseminated sclerosis most improbable. The choice seemed to lie between a slowly progressive cerebral lesion—possibly an infiltrating astrocytoma without raised intracranial pressure—and a lesion in the cervical region. Although C 4 and 5 were fused, there was a definite line of demarcation between them, and it seemed possible that some degenerated disk remnants might have been protruded backwards.

The case was referred to Dr. Macdonald Critchley at the National Hospital, Queen Square, London, who subsequently admitted the patient.

The results of special examinations carried out at that hospital were as follows: Examination of the C.S.F. was normal. A myelogram gave a normal picture with no evidence of a hold-up. The left carotid arteriogram gave a normal result. An electroencephalogram, details of which are omitted, was also normal. Dr. Critchley thinks that the probable diagnosis in this case is status dysraphicus; that is to say, "a combination of congenital defects in the vertebral column and in the underlying spinal cord. These defects usually take the form of congenital fissures or cracks, sometimes amounting to an actual syringomyelia."

## Discussion

Although, unfortunately, no definite proof of the diagnosis in this case can be given, the available evidence strongly suggests that the patient's condition is the result of a cord lesion, and, as cord tumour or cervical spondylosis can be excluded with almost complete certainty, some other explanation must be found. The association of skeletal deformities and syringomyelia is mentioned in all textbooks. However, the occurrence of related cord lesions which produce very different clinical conditions is less well known. Thus Richardson (1954), writing on syringomyelia, after commenting on the fact that cavity formation is commonest in the cervical region, states: "The cavity is virtually always in a position to interrupt the crossing fibres carrying pain and temperature sensation. . . ." The characteristic dissociated anaesthesia has been so firmly fixed in our minds that we may be in danger of failing to recognize the occurrence of allied atypical conditions. The association of abnormalities of the cord with the Klippel-Feil syndrome and Sprengel's deformity is also recognized (Kinnear Wilson, 1955). Critchley (1926) has reported the case of a man aged 45 who presented with a left-sided paraplegia associated with Sprengel's deformity and a reduction in the number of cervical vertebrae. The neurological signs were thought to be due to a coincidental congenital intramedullary abnormality. A further case of paraplegia associated with Sprengel's deformity and absence of some of the upper cervical vertebrae was described by du Toit (1931), although in this case extensive sensory disturbances probably indicated true syringomyelia. Several other similar cases are recorded, but in all of them the skeletal deformity was gross.



## Case of Unilateral Spastic Weakness

In the present case skeletal deformity was slight, although, in view of the common association of scoliosis and syringomyelia, it is interesting to note that a dorsal scoliosis was present.

Similar cases may rarely be encountered, and the differential diagnosis from such conditions as cervical spondylosis, cord tumour, and disseminated sclerosis must be extremely difficult in the absence of skeletal abnormalities or the typical sensory changes found in syringomyelia. However, the absence of any demonstrable abnormality on myelography, the history, and in particular the presence of skeletal abnormalities such as congenital fusion of vertebrae, absence of vertebrae, and spina bifida occulta or aperta, may lead to a suspicion that coincidental congenital cord defects may be present.

### Acknowledgments

I am indebted to Dr. H. Rhys Davies, Physician in Charge of Physical Medicine, Peace Memorial Hospital, Watford, for permission to publish this case, and to Dr. Macdonald Critchley, National Hospital, Queen Square, for permission to publish the results of special investigations and his comments on the case.

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R. W. BARTER

University College Hospital,  
London.

## NEW APPLIANCES

### SLIDING BACK TO THE MODEL 8 DINGWALL TRANSIT CHAIR

THERE are many chairs on the market with removable arms which facilitate the patient getting on and off the chair to bed or toilet, as the case may be. In certain types of case, however, the patient finds it easier to go backwards over the chair on to the bed or toilet. A simple modification by which the ordinary standard No. 8 transit chair (in this case the "Dingwall") can be so adapted is shown in Plate III.

Two lengths of phosphor bronze Bermudian sail mast track, overall width  $\frac{3}{4}$  inch, are fixed with self-tapping metal screws to the back vertical members of the chair. The ordinary canvas back is strengthened by two strips of  $\frac{1}{8}$  by  $\frac{1}{2}$  inch strip iron on each side, and the mast track slides are attached to this. It is a very simple matter for the patient to unclip the retaining loops at the top and push the back down to just below seat level. He then slides backwards from the chair to the appropriate article of furniture. It should be noted that this method of leaving the chair is not usually convenient for people with fixed knees or with bilateral heavy callipers.

This modification has been approved by the Ministry of Pensions and can now be specified when ordering the chair.

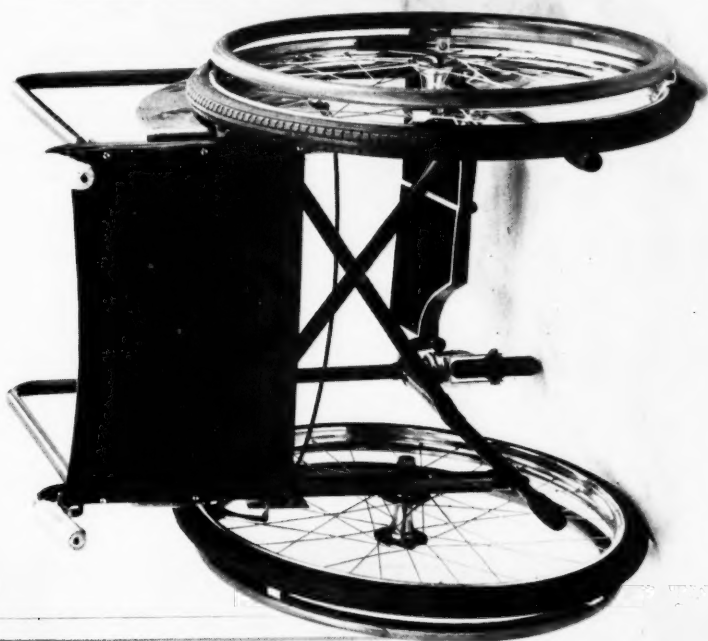
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PLATE III



The Model 8 Dingwall transit chair with sliding back. On the right the back is shown lowered.

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## BRITISH ASSOCIATION OF PHYSICAL MEDICINE

### FIRST PROVINCIAL MEETING

THE first Provincial Meeting of the British Association of Physical Medicine was held on Saturday, October 1, at Cambridge. The programme both scientific and social was arranged by Dr. W. A. Fell.

Before the scientific meeting began Dr. A. C. Boyle paid tribute to the memory of our well-beloved President, Lord Horder. The assembly stood for a moment in silence.

#### Scientific Programme

Dr. Fell then took the Chair and introduced Mr. E. S. JAMIESON, F.R.C.S.E., Orthopaedic Surgeon to Newmarket General Hospital, who spoke with insight and from long experience on "Some Rural Stresses". He welcomed his close association with Physical Medicine, saying how much he valued the combined clinics which he held with Dr. Fell. He reviewed the characteristics of the East Anglian population, pointing out that country folk are no less attracted by the possibility of compensation than are their fellows in the towns. Of one special section of the community with whom he had contact, the horse-racing fraternity, he said he had noticed what good medical orderlies came from the ranks of stable-boys. East Anglia, he said, was a land of stoopers, and accordingly the lumbar intervertebral disks met with much of the special stresses of country life. He expounded his enlightened views about disk lesions, and went on to discuss bicipital tendinitis, animal accidents, and the exposure to cold associated with tractor-driving. He ended by stressing a point, which subsequent speakers also emphasized, namely, that there was no such thing as "light work" on the land.

The next speaker was Mr. S. TAYLOR, Chairman of Cambridgeshire Agricultural Executive Committee. He made the point that so often the main stumbling-block in getting a man back to work was "what the doctor said". He accordingly begged his audience to be more careful in what they said. He explained the working of the Wages Board and the way in which a disabled agricultural labourer could, if he wished, apply for part-time employment at less than normal rates. This was sometimes useful, as most people were happier doing a little work rather than none at all. Farmers were, by and large, better at looking after their employees than most other sections of employers.

After lunch in the Hall of Sidney Sussex College, the afternoon's first speaker was Miss B. M. JONES, B.A., of the Ministry of Labour, who spoke on "The Employment Aspect of the Resettlement of Rural Workers". She pointed out the transport difficulties in rural areas, and how it was imperative to find work near to the labourer's home. Also, farm work could not be broken down. Fortunately the pace on a farm was comparatively slow, and "finish" need not be so good. She pointed out that when resettlement off the land was necessary there was the difficulty that only very few factories were available. The trades of agricultural blacksmithing and saddlery might absorb a small number of workers; also, the Ministry of Agriculture and Fisheries had training schemes in

## British Association of Physical Medicine

action. In addition a scheme had been worked out whereby employers could be paid grants for the retraining of the disabled. Miss Jones ended her talk by stressing the deep-seated reluctance of the countryman to move away from the district and community he knew.

Dr. ARTHUR MASSEY, C.B.E., Chief Medical Officer to the Ministry of Pensions and National Insurance, then spoke on "Industrial Disablement and National Insurance". He stressed the vastness of the finances involved, and said how important was the doctor's certificate of incapacity. Sickness accounted for fifteen times as much time lost as did injury. Out of an annual turnover of £590 million, only £40 million went to the N.H.S. Whereas the total of disablement benefit now paid out approximately equalled injury benefit, it was estimated that in the future the ratio would become 3 to 1. Dr. Massey also said that figures did not indicate that the agricultural worker was prone to rheumatism.

Dr. FELL wound up the meeting before tea. He stressed again that there was no light work on a farm, and that it was extremely difficult to do anything about the resettlement of a disabled agricultural labourer after he was fifty. He also made a special plea for the farmer's wife, pointing out how difficult it was for her unless she kept 100% fit.

### Social Events

Between 5.30 and 7 p.m. visitors to Cambridge had the opportunity of seeing something of the city.

Dr. Fell very kindly invited those who were staying for the dinner to take sherry beforehand. A very enjoyable dinner was followed by a liberal flow of the College's excellent port and madeira. There were no speeches. Accommodation was arranged for those who wished.

\* \* \*

This meeting, the first provincial meeting of the Association, was attended by more than forty members and by several guests. It was a huge success, and Dr. Fell is to be congratulated on the arrangements and heartily thanked for all his hard work and for acting the host in such an excellent manner. This was truly a one-man show.

D. C. ARNOTT

### ANNUAL MEETING, 1956

#### Preliminary Announcement

THE Annual Meeting will be held at the London Hospital, Whitechapel, London, E.1, on Friday and Saturday, April 27 and 28, 1956. A full programme will be circulated in March, but the provisional arrangements are as follows:

#### *Friday, April 27*

Morning. Short papers.

Afternoon. Discussion on "Degenerative Joint Disease".

Evening. Annual Dinner at the Royal College of Surgeons.

#### *Saturday, April 28*

Morning. Annual General Meeting.

Afternoon. Clinical Meeting.

## BOOK REVIEWS

*Services for the Disabled.* Pp. 88. 4s. 6d. net. London: H.M. Stationery Office. 1955.

This book, a slim paper-backed volume, is published for the Ministry of Labour and National Service by Her Majesty's Stationery Office. It is the work of the Standing Committee on the Rehabilitation and Resettlement of Disabled Persons and its object is to present "a simple, concise and factual account of the provision now made in the United Kingdom for the rehabilitation and resettlement of the disabled". It succeeds admirably in this task.

A short historical introduction is followed by chapters on the Medical and Employment Services describing medical rehabilitation, industrial rehabilitation units, and Government training centres. The Disablement Resettlement Officer is portrayed as the link between the two services, and resettlement is described as only a phase in a continuous process which starts in the hospital and ends at the work-bench. Legislation is discussed in some detail, especially the Disabled Persons (Employment) Act of 1944, the National Insurance (Industrial Injuries) Acts, 1946-53, and the National Assistance Act of 1948. Certain categories of disabled persons, such as the blind, the deaf, ex-Service personnel, and paraplegics, are considered individually. At the end of the book are listed voluntary and other organizations concerned with the disabled together with relevant publications. The book contains twenty-five photographs illustrating various aspects of the subject, and there is a satisfactory index.

Most specialists in physical medicine will find this a useful book of reference. It fills a gap in the literature on the subject, and in particular I commend it to candidates for the Diploma in Physical Medicine.

S. MATTINGLY

*Peripheral Circulation in Man—A Ciba Foundation Symposium.* Pp. 210; illustrated. 25s. London: J. and A. Churchill Ltd. 1954.

This book provides an excellent account of a symposium held from May 11 to 13, 1953, under the chairmanship of Dr. O. G. Edholm from the Medical Research Council Laboratories, Hampstead. Research investigators and clinicians from Great Britain and Ireland, Europe, the United States, and Canada who are foremost figures in this field of medicine were present. Several papers were read, and the subsequent lively discussions are reported more or less verbatim.

Physical medicine specialists should find the sections on methods available for measuring human peripheral blood flow, and the changes in peripheral circulation with exposure to cold and in the spinal man, of special interest. The latter is introduced by an excellent paper by Dr. L. Guttman, of the Spinal Injuries Centre, Aylesbury. In fact a great deal of interesting information concerning the peripheral vascular system may be obtained from this symposium.

A. B. COYER

## ABSTRACTS OF THE LITERATURE

**Measurements and Recording of Joint Function.** J. W. BATCH. *U.S. Armed Forces med. J.*, 1955, 6, 359.

This article describes in detail and amplifies the method of Cave and Roberts (*J. Bone Jt Surg.*, 1936, 18, 455) of measuring and recording movement in the cervical and lumbar spine and in the joints of the extremities. A neutral position—standing erect, fingers extended, thumb adducted, and feet parallel—is taken as the starting point of each movement in every joint. Failure to attain this position—for example, in the hip—is regarded as so many degrees of permanent flexion.

Good line diagrams are included, but with regard to the lumbar spine details are not sufficient to ensure identical results between different examiners on the same subject. A chart for recording movements of every joint with a column giving the normal figure is appended.

J. M. MILNE

**Methods of Measurement of Muscle and Joint Function.** N. SALTER. *J. Bone Jt Surg.*, 1955, 37B, 474.

In this paper from the Medical Research Council Unit for Research on Climate and Working Efficiency the importance of accurate methods of measuring the strength of muscles and the range of joint movements is stressed. Various subjective and objective methods of measurement are reviewed and the main types of apparatus discussed. Factors influencing the measurement are also discussed.

The author favours the strain-gauge dynamometer for measuring muscle power, and the protractor arthrometer for measuring joint movements in routine clinical work. A radiographic technique is preferred for recording joint movements for research purposes.

The paper contains 118 references.

[This critical review will be of great value to all those interested in the study of joint and muscle function.]

P. J. R. NICHOLS

**Phenylbutazone ("Butazolidin"): Good or Evil? Antirheumatic or Analgesic?** M. KELLY. *Med. J. Aust.*, 1954, 2, 504.

A survey was carried out after two years of general use to ascertain if phenylbutazone can be used without restriction, and whether it is antirheumatic or analgesic. Of a series of 605 patients reviewed, 500 were relieved and 105 remained under treatment after one year. In 50 of the cases the symptoms were controlled by 100 mg. a day or less. Of 92 patients with gout or localized and recent lesions (backache, sciatic pain, stiff neck, painful feet or shoulders) all ceased treatment and remained cured. Selection of patients resulted in toxic effects becoming less common; the drug was not given to the last 190 patients of the series, or to patients over 65 years of age or with chronic illness. Toxic effects were found to be due partly to overdosage, partly to age, but chiefly to unknown factors.



## Abstracts of the Literature

The optimal dosage was found to be 600 mg. daily for two days followed by 400 mg. daily; if this resulted in relief of pain, dosage could be reduced to 300 mg. and then to 200 mg. daily. The author recommends that if treatment is ineffective it should be stopped after one week and tried again in three weeks. A refractory state may be induced by continued high dosage or by underdosage; in most, but not all, cases this can be overcome by withdrawing the drug completely for eight to twelve weeks. The author asks why phenylbutazone is not called antirheumatic instead of analgesic, as it acts after twelve hours and its effects last two to three days.

Phenylbutazone treatment did not help any of the 35 non-rheumatic patients in the series who were suffering from pyogenic cellulitis, traumatic inflammation, peripheral neuritis, spinal metastases, or carcinoma of the pancreas.

The author concludes that phenylbutazone resembles cortisone in its decisive effect on acute arthritis and in two of its toxic effects (water retention and peptic ulceration). He considers it more valuable than cortisone, however, because amongst other things it relieves nearly all the rheumatic disorders. He maintains that it is no argument against phenylbutazone that it fails to pass the objective tests (strength of grip, circumference of finger-joints); the valid test is relief of an acutely painful joint or enabling a disabled patient to work again.

D. WOOLF

### **A Clinical Trial of a Derivative of a Bile Salt in the Treatment of Rheumatoid Arthritis.** T. C. HIGHTON. *N.Z. med. J.*, 1954, **298**, 569.

At the Queen Elizabeth Hospital, Rotorua, New Zealand, a trial was made of the effect of tri-ketocholanic acid ("decholin" or "suprachol") in 56 cases of rheumatoid arthritis and ankylosing spondylitis. In this preliminary report of the investigation the author gives his reasons for the choice of this preparation. He employed the recognized criteria of classification of severity, functional ability, and improvement. Some of the patients were given ACTH and cortisone in addition to the preparation under trial. The author recommends a two-year course of twice-weekly injections, and reports that 63.3% of the cases derived benefit (Grade I and II improvement).

A. ROWATT BROWN

### **Le Diagnostic de Polyarthrite Chronique Évolutive.** R. MOISE. *Strasbourg méd.*, 1954, **5**, 375.

This is a lecture (part of a revision course) dealing with the classification of the rheumatic diseases and the differential diagnosis of rheumatoid arthritis.

J. F. BUCHAN

### **The Treatment of Rheumatic Diseases by Desensitization with an Aqueous Extract of Streptococci.** J. C. SMALL and J. C. SMALL, JR. *Ann. Allergy*, 1954, **12**, 409.

The use of an aqueous extract of streptococci as a special form of treatment in rheumatoid arthritis is described; four illustrative case histories are presented. The authors claim that there are no side-effects unless an overdose of the vaccine is given, when a temporary flare-up will occur. Altogether fifty-one patients had been treated for more than two years, the average period of treatment for the

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whole group being 10.2 years. Apparently all the patients were ambulant and functionally self-sufficient at the time of publication of the report.

[No details are given of criteria of improvement, and apparently no control study was made.]

J. H. GLYN

**Widespread Serous Membrane Involvement by Rheumatoid Nodules.** P. ELLMAN, L. CUDKOWICZ, and J. S. ELWOOD. *J. clin. Path.*, 1954, **1**, 239.

The authors report the clinical and necropsy findings in a case of long-standing rheumatoid arthritis. Apart from the joint changes, typical rheumatoid nodules were widespread and involved the skin, arachnoid surface of the dura mater, pleura, pericardium, myocardium, endocardium, and heart valves.

During life a left-sided pleural effusion was thought to be due to the pleural involvement and was not influenced by cortisone therapy. A 2:1 heart-block with right axis deviation was the main finding in the cardiovascular system. The authors state that involvement of the dura mater has not previously been reported. Clinically, during the last two months of life the patient had suffered from episodes of loss of consciousness, and these were preceded by Jacksonian fits.

The aetiology of the rheumatoid nodule is still unknown. It may be due to occlusive lesions in the vascular system, but careful examination of the rheumatoid lesions and other tissues failed to show any vascular changes. Fibrinoid degeneration may thus be the essential change, with secondary involvement of the newly proliferated mesenchymal cells of the nodule, and later of older structures such as blood vessels and mature collagen bundles.

R. W. BARTER

**The Effect of Phenylbutazone on Uric Acid Metabolism in Two Normal Subjects.**

J. B. WYNGAARDEN. *J. clin. Invest.*, 1955, **34**, 256.

Phenylbutazone is known to reduce the serum urate level in both normal and gouty subjects; this study is designed to determine the mechanism. Two normal subjects were placed on constant low-purine diets. Uric acid-N was infused during control periods and again during phenylbutazone administration. The miscible pool of uric acid and the rate of its turnover were determined, results obtained being correlated with changes in excretion values and serum concentrations of uric acid. Unchanged isotopic uric acid in the urine was recovered to evaluate extrarenal disposal or catabolism of urates. Finally the volumes of distribution of uric acid were calculated; the changes observed were correlated with body weight and with haematocrit measurements in one subject.

From a comparison of the magnitudes of contracture of the miscible pools and the cumulative increments in urinary urate excretions it is shown that the uricosuric effect of phenylbutazone explains the suppression of serum urate concentration.

The extrarenal disposal and catabolism of urates, as measured by urinary recovery of N<sup>15</sup> in uric acid, were reduced in both subjects, or, as measured by the percentage of the urate turnover appearing as urinary uric acid, were unchanged in one and reduced in the other subject. These changes were probably secondary to the marked reduction in serum urate concentration.

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The uric acid space increased by about 5 litres in both subjects, but this expansion explained only a small portion of the suppression of serum urate concentration; in one subject this was partly attributed to retention of fluid and expansion of extracellular fluid volume.

The author concludes that phenylbutazone has only one important effect on uric acid metabolism in normal subjects, and that is the enhancement of urinary urate excretion.

MAURICE HART

**The Anti-Thyroid Effect of Phenylbutazone.** M. E. MORGANS and W. R. TROTTER. *Lancet*, 1955, 2, 164.

Phenylbutazone is known to inhibit the uptake of radioactive iodine ( $I^{131}$ ) by the thyroid. In this paper a case is recorded in which it caused a clinically obvious goitre.

The technique of investigating its effect on the thyroid is to give oral tracer doses of  $I^{131}$ , followed an hour later by potassium perchlorate orally. If the  $I^{131}$  is present in the thyroid in the form of inorganic iodide the perchlorate will cause it to be discharged from the gland and the thyroid counting rate falls. This will provide evidence that the organic binding of iodine by the thyroid has been prevented or slowed down. Thiouracil inhibits the binding of iodine, and hence the method can be used to show whether or not a drug has an action resembling that of thiouracil.

These tests on the above patient and on others receiving phenylbutazone showed there was a well-marked block in the synthesis of organic iodine compounds within the thyroid. No such block was found if less than 400 mg. of phenylbutazone was taken daily, and none occurred in three subjects given a single dose of 200 mg. The block became more complete the longer the patient had been taking phenylbutazone.

[This work constitutes a valuable additional contribution to our knowledge of the toxic effects of phenylbutazone, and is a warning to avoid exceeding a dosage of 400 mg. daily.]

J. SHULMAN

**Beitrag zur Kenntnis eines rheumatischen Syndroms mit allgemeinen Befall des Knorpels.** H. HARDENS. *Schweiz. med. Wschr.*, 1954, 84, 712.

In 1936 Meyerburg described a case with generalized softening of cartilage; histologically there were inflammation and partial degeneration. Subsequently a second case was described by Gordon, Perlman, and Shechter in a 34-year-old negro in the U.S.A. The present author, having found a third case, considers that the condition is an entity. In his patient, a lad of 16, the illness, as in previous cases, began with an influenza-like attack. Sore throat, hoarseness, enlargement of cervical lymph nodes, and above all difficulty in breathing, were present. (The latter is due to the early softening of cartilage in larynx and trachea; tracheotomy is a life-saving measure.) Later nose, ears, and ribs were involved. A typical saddle nose developed. There were extremely tender areas over the rib cartilages, and the sternum finally sank in. Chronic tracheo-bronchitis developed owing to collapse of medium- and small-sized bronchi.

The presence of episcleritis, iridocyclitis, myocarditis, and polyarthrits (usually affecting the large joints) in these cases suggests that a collagen disease is

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involved. Spontaneous pneumothorax may occur. The American authors called the disease "diffuse inflammation of cartilage"; the term "panchondritis" is, however, to be preferred. There is no specific treatment, but potassium iodide seems worth a trial.

D. PREISKEL

### **Complete Relief of Gout.** F. G. W. MARSON. *Lancet*, 1955, 2, 360.

The serum uric acid in chronic gout is controllable by the continuous administration of sodium salicylate, and the arrest and repair of destructive changes can be demonstrated radiologically. Both sodium salicylate and probenidol lower the serum uric acid level by decreasing the reabsorption of uric acid in the renal tubules and thus increasing the excretion of uric acid in the urine, though sodium salicylate is the more effective of the two. Again, probenidol may produce severe toxic symptoms and allergic reactions, and also is more expensive than salicylates. Its use is justifiable, however, where patients cannot tolerate salicylates.

As it takes several months to achieve control of the serum uric acid level with both preparations, acute gouty episodes may occur in the early stages of treatment, and such acute paroxysms will require treatment by colchicine. No dietary or alcoholic restrictions are imposed apart from a large intake of fluids.

Sodium salicylate is given in a dosage of 30 grains t.d.s., and probenidol in a dosage of 0.5 g. four times daily. With both drugs the dosage should be reduced if toxic effects appear. In the author's series the duration of treatment necessary to eradicate chronic symptoms varied from 2 to 21 months. He suggests that reabsorption of urate deposits may continue for many months, and that during this time the tissue fluids in proximity to the dissolving tophi may have a higher uric acid level than the serum and this may explain why acute paroxysms of gout can occur with a normal serum uric acid level. Acute paroxysms cease when the urate deposits are completely absorbed or the remaining deposits are insoluble.

[The author is to be congratulated on his most valuable contribution to the therapy of a condition which in the past has so often been one of the major causes of crippling arthritis.]

J. SHULMAN

### **Osteoarthritis of the Hip: A Study of the Nature and Evolution of the Disease.**

M. H. M. HARRISON, F. SCHAJOWICZ, and J. TRUETA. *J. Bone Jt Surg.*, 1953, 35B, 598.

In an investigation at the Nuffield Orthopaedic Centre, Oxford, the development of osteoarthritis in the hip-joint was followed by examining 91 hip-joints post mortem (age range, 0 to 100 years), 45 femoral heads removed at operation, and radiographs of 80 selected patients with osteoarthritis of the hip. The tissues were subjected to macroscopic, microscopic, and radiographic examination, and a detailed investigation of the vascular patterns.

The articular cartilage of the head of the femur is described as being divided into "pressure" and "non-pressure" areas, in relation to the trabecular pattern of the head of the femur (the "pressure system") and the articular cartilage of the acetabulum.

It was found that in all subjects over 14 years of age the femoral head showed cartilage degeneration. In 71 % the degeneration was in non-pressure areas alone,

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in 3% in the pressure areas alone, and in the remaining 26% both pressure and non-pressure areas were affected. Although no direct relationship between age and the degree of cartilage degeneration was observed, it was found that the more pronounced the pressure system the more evident the development of cartilage degeneration in non-pressure areas.

In the non-pressure areas the depth of the non-calcified cartilage was reduced and that of the calcified zone increased; subchondral blood vessels were seen to have entered the calcified cartilage and to have spread widely, usually preceded by calcification.

New bone and marrow, resulting from advancing vascularization and ossification of cartilage at points where the normal stability of chondro-osseous junction had been lost through degeneration of the cartilage, was found to be limited to areas of low joint stress (non-pressure areas). This osteophytosis, which is not restricted to marginal areas, is believed to be an attempt to revitalize the degenerating cartilage, and bears a close similarity to normal bone development.

The arterial pattern of the osteoarthritic femoral head was found to be in a state of vascular profusion and dilatation, and not ischaemic as previously thought. From its inception osteoarthritis entails the appearance and growth of blood vessels, and as the disease develops so does the vascular tree in and around the bone. This hypervascularity was greatest in the most advanced cases of osteoarthritis.

In the pressure areas the degenerating cartilage was thinned, and invaded by subchondral vessels laying down sclerotic bone. Later the full thickness of cartilage was destroyed and the upper surface of the femoral head denuded of cartilage.

Cysts, seen on radiography occurring within the pressure system, were found to be aggregations of fibrous tissue with vascular walls. Zones of necrosis were seen in advanced stages usually within and between the cysts. These findings are attributed to infarction consequent upon collapse.

The destructive phase of the disease entails the flattening of the femoral head, which the authors consider to be due to the combined effect of restriction of mobility giving rise to increase in the load through the remaining pressure area in use; weakening of the pressure system by hypervascularization; and the loss of the cushion effect of normal articular cartilage. The flattening of the head and the smoothness of the flattened head favour lateral displacement, thus increasing the infero-medial non-pressure area and decreasing the mobility of the joint and the pressure area in use. A further increase in the load on the remaining pressure area results. This would explain the continuation of the collapse of the pressure system.

The authors thus build up a picture of osteoarthritis, initiated in the articular cartilage and progressing by osteophyte production, flattening of the femoral head, eburnation, necrosis, sclerosis, cyst formation, and extrusion of the head. A juxtachondral hyperaemia is induced in response to cartilage degeneration. Once the vessels invade the cartilage, then the bone and marrow of osteophytes are inevitably laid down.

It appears from this investigation that daily usage preserves rather than

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"wears out" articular cartilage, and the disabling factor in osteoarthritis is "not the degeneration of the cartilage but the vigorous and persistent attempts at repair, attempts which aggravate the already disordered function of the joint, not only by osteophyte formation, but also by hypervascularity which weakens the structure of the bone beyond the point where it can carry its load". The resulting collapse only provokes further efforts at repair, thus completing a vicious circle.

P. J. R. NICHOLS

**Allergic Polyarthritis.** E. ANDERSON. *Acta allerg. (Kbh.)*, 1954, 7, 409.

The author discusses experimental allergic arthritis in rabbits. As clinical analogues of this he instances: (1) allergic polyarthritis and polytendinitis; (2) intermittent neuralgic pains; and (3) intermittent hydrarthrosis.

Two cases are described in which intermittent attacks of arthritis were said to be due to specific forms of allergy. These responded satisfactorily to desensitization and the avoidance of the offending antigen. Such attacks are said to be characterized by a relative lymphocytosis, slight anaemia, and often an eosinophilia.

J. H. GLYN

**Ankylosing Spondylitis.** F. DUDLEY HART. *Ann. rheum. Dis.*, 1955, 14, 77.

The author reviews 184 cases of ankylosing spondylosis. He found that in 24 cases (13%) the disease started with symptoms in peripheral joints; 25 of the patients suffered from iridocyclitis, 7 from pulmonary tuberculosis, and 21 from peptic ulceration.

G. D. KERSLEY

**Therapy of Felty's Syndrome.** P. ELLMAN, L. CUDKOWICZ, and J. S. ELWOOD. *Ann. rheum. Dis.*, 1955, 14, 84.

The authors give details of three cases of Felty's syndrome, and after a discussion come to the conclusion that splenectomy is the treatment of choice in this condition.

G. D. KERSLEY

**Das Sjögren-Syndrom in der Allgemeine praxis.** W. ACHENBACH and G. STOLLBERG. *Dtsch. med. Wschr.*, 1954, 79, 1745.

According to the authors, when a middle-aged woman complains of dryness of mucous membranes or a burning sensation in the tongue she may be suffering from Sjögren's syndrome. The vagina, mouth, and eyes may be affected, there may be achylia gastrica, slight anaemia, a raised erythrocyte sedimentation rate, and, in two-thirds of cases, arthritic manifestations of the rheumatoid type. Six cases are described in which xerostoma was the most prominent symptom. In five of the cases the gamma-globulin level was raised and the E.S.R. was between 46 and 55 mm. (Westergren). The authors state that the diagnosis usually presents no difficulties, but avitaminoses (for example, when rhagades are prominent) and sarcoidosis have to be excluded. They consider that many cases of burning sensation in the tongue are probably due to this condition. There is no specific treatment, but ACTH and cortisone are useful in acute exacerbations.

D. PREISKEL



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**Stress Factors in the Disc Syndrome.** J. C. SCOTT. *J. Bone Jt Surg.*, 1955, 37B, 107.

The author, writing from the Nuffield Orthopaedic Centre, Oxford, postulates a sequence of events in which the pressure within the annulus fibrosus may increase beyond the normal level (in some instances leading to acute back pain), and that this may be repeated until rupture of the annulus occurs in those disks naturally subjected to the greatest pressure. He further suggests that emotional strain may be a factor in producing the periodic increases in pressure.

After summarizing other experimental work demonstrating that the tension within the intervertebral disk may be altered, he describes experiments to investigate the effect of stress on the intervertebral disk and the size of the nucleus. Voles, after being exposed to the stress of daily periods of fighting, were killed and their spines examined and compared with those of unstressed animals. Statistical analysis showed a highly significant increase in the size of the nucleus in the stressed voles relative to those of the controls.

It is suggested that there is corroboration of a clinical hypothesis that some cases of disk syndrome may be related to psychic stress.

D. J. E. CHESHIRE

**Spinal Disk Lesions.** J. CYRIAX. *Brit. med. J.*, 1955, 1, 140.

The author reaffirms his belief that disk protrusions are a common cause of pain in the neck and shoulder girdle, brachial neuritis, chest pain, lumbago, and sciatica, and that such protrusions can be "reduced" by manipulation without anaesthetic, leading to relief of symptoms. Traction sustained for periods of up to one hour daily is an alternative and sometimes selective method of treatment, and epidural injection of local analgesic is also used in some cases—for example, acute lumbago that is too painful for manipulation. A plaster jacket or spinal corset may occasionally be employed, but only after "reduction".

No detail of the manipulations used is given, but it would appear that they are relatively simple, as they can be performed even by physiotherapy students. Considerable success is said to have been obtained by these methods, though no figures are quoted. A plea is made for more general and early use of manipulation by doctors and medical auxiliaries with a view to economizing time off work of these patients.

A. ZINOVIEFF

**Blocs Vertébraux.** M. SIMON. *Acta phys. rheum. belg.*, 1954, 9, 119.

Generally the synostosis in block vertebrae is partial and is localized to the fusion of the vertebral bodies. Occasionally, however, other vertebral elements are joined together—for example, spinous processes, laminae, apophysial joints, transverse processes. These abnormalities may occur in various combinations and be associated with other vertebral and visceral congenital abnormalities. The author describes the anatomy of fused vertebrae, the clinical signs and symptoms of blocks (if any), complications, the differential diagnosis between congenital and acquired blocks, and their pathogenesis. He concludes by giving details of four of his cases of this congenital abnormality.

[This is a good summary of our knowledge of block vertebrae.]

J. F. BUCHAN

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**Low Back Pain Treated by Manipulation.** A. B. COYER and I. H. M. CURWEN. *Brit. med. J.*, 1955, **1**, 705.

This is a report from St. Thomas's Hospital, London, on 152 patients with acute low back pain, commonly known as "lumbago", in which no positive cause for the symptoms could be found on either clinical or radiological examination, but a derangement of one of the intervertebral joints was assumed. Of the 152 patients, 76 were treated by manipulation without anaesthetic (carried out by trained or trainee physiotherapists) and the other 76 by bed rest at home with a lumbar pillow and analgesics. Of the latter group 16 did not carry out instructions or return for reassessment and are excluded from the final figures.

At the end of one week 50% of the group treated by manipulation were free from symptoms and signs, but only 27% of those treated by rest in bed. At the end of six weeks only 12% of the first group had residual symptoms and signs as compared with 28% in the second group.

In the two groups as a whole trauma was a predisposing factor in about 50% of patients; a sagging mattress was used by about 20%. A. ZINOVIEFF

**Osteoporosis and Compression Fractures from Prolonged Cortisone and Corticotropin Therapy.** W. S. EISENSTADT and E. B. COHEN. *Ann. Allergy*, 1955, **13**, 252.

The literature of this complication of cortisone therapy is briefly reviewed and two additional cases are described, in only one of which did a true fracture occur. Androgens are recommended as satisfactory symptomatic treatment with a logical basis. High-protein diets are also considered desirable.

J. H. GLYN

**Early Management of the Paraplegic Patient.** H. A. RUSK. *U.S. armed Forces med. J.*, 1955, **6**, 157.

This article outlines the management of the paraplegic from the time of injury until transfer to a special unit. Measures that can be taken during this period to reduce the incidence of those complications which delay rehabilitation are discussed.

After injury any flexion or hyperextension may transect the cord that has survived, therefore the patient must be lifted with greatest care and transported in a neutral position on a firm stretcher or a door. Rather than risk further injury, radiological examination should be deferred and nursing on a foam-rubber mattress over boards is recommended.

Early laminectomy to assess accurately the damage done is desirable. The sooner the patient knows the worst the more readily will he accept the retraining process. Among routine nursing procedures discussed are scrupulous care of pressure areas, turning by the Stryker frame two-hourly, sponging for spontaneous pyrexial attacks during spinal shock, daily bowel evacuation, and the use of neostigmine for bowel distension. Bladder care requires early introduction of an indwelling urethral catheter, which is changed twice weekly, thrice-daily irrigation with isotonic saline, and repeated small doses of sulphonamides.

During the first two weeks there is a strongly negative nitrogen balance,



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which returns to normal in eight to ten weeks. A high-calorie (4,000), high-protein (150-gramme) diet is essential, and 50 mg. of testosterone propionate daily from the day of injury helps reduce tissue breakdown and weight loss.

In the retraining programme active exercises for unaffected parts should be begun as early as possible, concentrating initially on triceps and grip. The lower-limb joints should be given full-range passive movements ten times twice daily and the feet supported at right-angles. Spinal movements must be prevented, but as soon as it is orthopaedically safe early standing by means of a tilt-board reduces urinary complications.

The patient is usually fit for transport to a special centre by the fourteenth to eighteenth day.

J. M. MILNE

### Some Aspects of Shoulder Pain. O. OLSSON. *Brit. J. phys. Med.*, 1955, 18, 82.

The author sets out to examine the connexion between shoulder pain and degenerative changes in the rotator cuff. Shoulder pain is regarded as a collective term; cases of gross trauma, infection, or rheumatoid arthritis, or with evidence of pressure on nerve roots, are excluded. In a clinical series of 743 patients, 30% were or had been suffering from shoulder pain, the incidence of which was found to increase with advancing age. The left and right shoulders were affected in equal numbers. The incidence among patients with cardiac disorders was three times greater than the average. Inactivity was found to be a more frequent cause of pain than accidental trauma, and the author states that in his view cardiac disease causes shoulder pain indirectly by leading to inactivity; he also believes it may be important in causing persistent pain following minor trauma.

In a post-mortem series of 106 shoulders—from 53 patients who died within three months of examination—tendon and capsular rupture and calcaneous deposits were the types of lesion seen. Capsular rupture or fraying of the biceps tendon was present in about 50% of patients aged 60 years. Microscopically, in patients aged 40 years, 70% to 100% of the various cuff areas showed degeneration, the most advanced change being present in the distal part of the cuff. Nevertheless only 20% of patients with post-mortem evidence of cuff rupture had a history of shoulder trouble, and the same was true of cases of bicipital rupture. It therefore appeared that extensive lesions of the cuff were not incompatible with good function. The author concludes with surprise that on a statistical basis no connexion between shoulder pain and any of the recorded degenerative changes could be demonstrated in his series.

J. I. WAND-TETLEY

### Spondylolisthesis. E. W. O. ADKINS. *J. Bone Jt Surg.*, 1955, 37B, 48.

This paper is based on a review of 46 cases of spinal deformity operated on by the author. Of the 46 patients, 38 had laminal defects and in 8 the laminae were intact. Of the 38 with defects, 33 had spondylolisthesis and 5 spondylolysis.

The symptomatology of spondylolisthesis is discussed. Symptoms are said to fall broadly into two groups: backache, and pain referred to the lower limbs. The backache is attributed to the instability of the affected segment, which increases the strains on the intervertebral ligaments and joints and ultimately causes severe

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localized osteoarthritis. To explain the pain in the legs the author rejects the theory of referred pain, believing it to be due to direct interference with the nerve root.

Following a full and lucid description of the morbid anatomy as seen at operation, possible mechanisms of nerve-root irritation are discussed. The pseudarthrosis of the laminal defect is described as an ill-defined mass of fibrous tissue, often of considerable dimensions, bulging well beyond the bony margins of the pseudarthrosis and partly blocking the entrance to the intervertebral foramen. The emerging nerve root is in immediate anterior relation to the mass, and in over half the cases in this series was bound to it by dense adhesions. In other cases compression was observed in the intervertebral foramen between the pseudarthrosis posteriorly and a projecting osteophytic ledge anteriorly.

Aetiology and surgical treatment are also discussed. The author's operative procedure is divided into three stages: exploration, decompression of the nerve roots, and arthrodesis by means of inter-transverse or ala-transverse grafts.

D. J. E. CHESHIRE

### **Peroneal Spastic Flat Foot.** N. J. BLOCKEY. *J. Bone Jt Surg.*, 1955, **37B**, 191.

This paper from the Manchester Royal Infirmary reports a study of 30 feet showing the peroneal spastic flat-foot deformity. Of the 30 feet 22 had some tarsal anomaly, but there was no constant relationship between the degree of rigidity and that of radiographic abnormality, it being pointed out in this connexion that the full clinical picture may be seen in feet without tarsal anomalies. In all cases the foot was examined under anaesthesia, when rigidity indicated a severe developmental anomaly; mobility, however, did not necessarily imply a normal tarsal skeleton.

All the feet were treated by immobilization in a walking plaster for three months (with the foot inverted as far as possible). Physiotherapy was continued for up to two years; only after this time was operation considered. The feet that were improved by this conservative regimen were those which showed mobility under anaesthesia, and only those were normal after two years that had normal tarsal architecture.

The "irritable focus" and "reflex spasm" hypotheses are discussed. Evidence that the peroneus brevis is mostly responsible for the deformity is presented. It is concluded that, although a normal foot may develop the deformity under heavy stress, it seems likely that all feet presenting peroneal spastic flatness are "to some degree structurally abnormal, although the exact site of the abnormality may escape us".

P. J. R. NICHOLS

### **Rifle Sling Palsy.** H. H. MUNTZ, R. W. COONRAD, and R. A. MURCHISON. *U.S. Armed Forces Med. J.*, 1955, **6**, 353.

The authors describe 18 cases demonstrating the following clinical signs in the left arm: (1) disseminated paresis or paralysis involving muscle groups supplied by radial, ulnar, and median nerves; (2) stocking sensory changes involving cutaneous branches of the same nerves; (3) occasional vascular and/or nervous phenomena manifested by objective and subjective temperature

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changes; (4) vasomotor instability manifested by skin colour changes with variations in atmospheric temperature; (5) petechiae; and (6) desquamation at site of pressure.

American military trainees are taught to unfasten the rifle sling from the butt and fix it in a sliding loop round the upper arm. The tighter it is the steadier the rifle, but with prolonged firing the loop tightens and can produce a cyanotic or blanched, sometimes pulseless hand. A neuropraxia of some or all nerves (usually radial) at the level of the deltoid insertion occurs. All patients recovered spontaneously in one to twenty-one days.

Of 488 men examined after four hours' firing, 130 were found to have mild paraesthesia, 61 petechiae, and 6 weakness of muscles supplied by the radial nerve.

[As the British Army does not use this method of steadying the rifle it escapes this occupational hazard.]

J. M. MILNE

### **Rehabilitation Problems concerning Elderly Amputees.** R. LANGDALE-KELHAM. *Brit. J. phys. Med.*, 1955, 18, 27.

The question is posed whether there is justification for supplying prostheses to elderly patients. In the author's view it depends upon whether the patient can be expected to use the artificial limb without incurring physical harm, bearing in mind that a fitted limb renders the patient ambulatory and independent and, if he is still employed, may enable him to return to work.

During the rehabilitation of a patient with an above-knee amputation a pylon is prescribed; and then, judging the patient's performance with this fitting, a decision can be made whether a full articulated limb should be supplied.

The subsequent fate of 344 patients over the age of 65 who were fitted with artificial limbs was followed. About half of these (171) were successfully rehabilitated and still using their artificial limbs six months after discharge. Ten of the patients in this latter group were over 80. The author is of the opinion that age itself appears to be no bar to the supply of a prosthesis.

J. I. WAND-TETLEY

### **Short-wave Diathermy in Orthopaedics.** B. O. SCOTT. *Physiotherapy*, 1955, 41, 205.

This article deals with the problem of cross-firing the hip with diathermy with the object of obtaining greater heat intensity in the region of the hip-joint. New apparatus for achieving this has been tested in the laboratory. Three main factors are involved: (1) spacing of electrodes; (2) output of the generator; (3) maintenance of tuning. The author emphasizes that wide spacing beyond 1½ inches lessens the input to the patient below adequate treatment level and that more powerful generators may be necessary. The modern self-tuning apparatus is welcomed, as the difference between the input of a standard generator and a crystal-controlled self-tuning generator may be as much as 50%.

Cross-fire from two coupled generators operating at slightly different frequencies and working alternately at each half-cycle of the mains current

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has been shown to dissipate more heat in the deeper parts of a life-sized phantom, and the general heating of the hip is greater and more uniform. One important factor has been brought to light—namely, that with the condenser technique metal does not heat up but provides an easy pathway for the current. The current, however, heats the tissues at the edges of the conductor nearest the electrodes.

The author discusses the effects of the current on metallic implants such as the Smith-Petersen nail or vitallium cup, and in patients with an acrylic prosthesis.

The diagrams are clear and explicit.

L. D. BAILEY

**Experiences with Ultrasonics.** R. ROBINS-BROWNE. *S. Afr. med. J.*, 1955, **29**, 300.

The author relates his experiences in giving 3,000 treatments with ultrasound by means of a Siemens apparatus. He discusses the history of ultrasonics and describes the nature and generation of ultrasound. He finds that the heat produced by this method is moderate and induces mild hyperaemia and vasodilatation, a sedative effect on neural tissue with a minor antispasmodic and muscle-relaxant effect, a hastening in regeneration of the dermis, a temporary softening of collagen tissue, and an iontophoretic action, confirmed by the application of histamine. He believes micromassage to be one of the functions of ultrasonic treatment.

Dosage, the contraindications to treatment, its advantages, and symptoms of overdosage are outlined. The author summarizes his results in the treatment of various conditions, mentioning especially the good results obtained in post-traumatic conditions, in the supraspinatus syndrome, and in ankylosing spondylitis.

NATHAN FINN

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## NORTH AND MIDLANDS PHYSICAL MEDICINE CLUB

THE Club held its second meeting at the Radcliffe Infirmary, Oxford, on Saturday, October 8, 1955.

Dr. J. M. TITCOMBE was elected Honorary Secretary for the year 1956, and Dr. N. R. W. SIMPSON Chairman for 1957.

After a tour of the Department of Physical Medicine at the Radcliffe Infirmary, followed by sherry and lunch generously provided by the Board of Governors of the United Oxford Hospitals, Dr. E. F. Mason demonstrated six cases and discussed physiotherapy in relation to the local use of hydrocortisone. Dr. W. S. Holden and Dr. G. M. Ardran showed several cineradiographic films of the chest and discussed these in relation to the physiotherapy of that region. Dr. L. Cosin then gave a lecture on the geriatric problem with particular reference to the social handling and rehabilitation of elderly people. A short, stimulating discussion followed each of these papers.

Members and their wives later attended a dinner dance held at the Weston Manor Hotel.

The next meeting is to be held at Sheffield.